

Appl. No. 10/662,850  
Reply to Office action of 08/25/2004

### **REMARKS**

Reconsideration of the above-referenced application in view of the above amendment, and of the following remarks, is respectfully requested.

Claims 20-21 are pending in this case. Claims 20 and 21 are amended herein and claims 1-19 and 22-24 are cancelled herein as they are drawn to a non-elected invention.

The Examiner rejected claim 20 under 35 U.S.C. 102(b) as being anticipated by Chapman et al. (U.S. Patent 6,010,929).

Claim 20 is amended to further recite that the upper layer further comprises a hydrogen concentration greater than about atomic 15%. Support for the amendment is found in the specification on page 12, lines 1-9.

Applicant respectfully submits that amended claim 20 is unanticipated by Chapman as there is no disclosure or suggestion in Chapman of, in a method of fabricating a composite nitride cap, forming an upper layer on a liner layer wherein the upper layer is comprised substantially of nitride and further comprises a hydrogen concentration greater than about atomic 15%. Chapman teaches forming a cap layer over a gate to prevent the deep source/drain implant from implanting the gate electrode. Chapman does not discuss a hydrogen concentration of the silicon nitride cap layer. Accordingly, Applicant respectfully submits that claim 20 is unanticipated by Chapman.

The Examiner rejected claim 21 under 35 U.S.C. § 103(a) as being unpatentable over Chapman et al. (U.S. Patent 6,010,929) in view of Seo (U.S. Patent 5,877,514).

Appl. No. 10/662,850  
Reply to Office action of 08/25/2004

Applicant respectfully submits that amended claim 21 is patentable over Chapman in view of Seo as there is no disclosure or suggestion in the references of, in a method of fabricating a composite nitride cap, forming an upper layer on a liner layer wherein the upper layer is comprised substantially of nitride and causing dopants to segregate out of an Si/SiO<sub>2</sub> interface in the channel region during an annealing process. Chapman teaches forming a cap layer over a gate to prevent the deep source/drain implant from implanting the gate electrode. Chapman does not discuss a causing dopants to segregate out of an Si/SiO<sub>2</sub> interface in the channel region during an annealing process. Seo teaches an inverted thin-film transistor. After a laser annealing step, Seo teaches depositing a passivation layer that can have high hydrogen content. Seo further teaches that annealing the passivation layer can cause hydrogen to reach an interface between the channel and gate insulator and improve the interfacial characteristics. It would not have been obvious to one of ordinary skill in the art to have modified the anneal process of Chapman by utilizing hydrogen diffusion as taught by Seo for several reasons. First, Seo teaches forming a thin-film (polysilicon channel) device rather than a bulk silicon device as in Chapman. The diffusion characteristics of polysilicon are not identical to that of bulk silicon. Second, Seo teaches an inverted TFT structure in which the hydrogen containing passivation layer is deposited directly on the back side of the channel opposite the gate electrode instead of being further separated from the channel by a gate electrode and gate dielectric as in Chapman. Third, Seo teaches the hydrogen diffusion after the source/drain anneal. Thus, there is no suggestion to modify the source/drain anneal of Chapman to include hydrogen diffusion since Seo did not modify its own source/drain anneal to include the hydrogen diffusion. Accordingly, Applicant respectfully submits that claim 21 is patentable over Chapman in view of Seo.

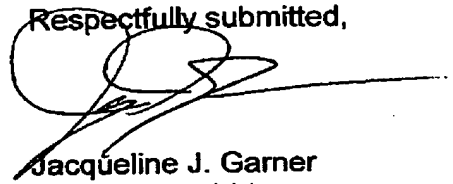
The other references cited by the Examiner have been reviewed, but are not felt to come within the scope of the claims as amended.

In light of the above, Applicant respectfully requests withdrawal of the Examiner's rejections and allowance of claims 20-21. If the Examiner has any questions or other

Appl. No. 10/862,850  
Reply to Office action of 08/25/2004

correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

Respectfully submitted,



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